UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/350,492	07/09/1999	VENKATESH KRISHNAN	10981455-1	8205

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EXAMINER
TANG, KENNETH

ART UNIT	PAPER NUMBER
2156	

DATE MAILED: 08/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.		Applicant(s)	
Office Action Summary	09/350,492		KRISHNAN ET AL.	
	Examiner		**Art Unit**	
	Kenneth Tang		2156	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-29_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-29_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1.   Claims 1, 11, and 25 are rejected under 35 U.S.C. 112, first paragraph, as containing

subject matter which was not described in the specification in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention.

Referring to claim 1, "set of methods" needs to be defined in the specification because it

is not explicitly clear how the threads interface layer provides thread support in the virtual

machine.

Referring to claims 11 and 25, "set of structures" needs to be defined in the specification

because it is not explicitly clear of what is cleaned up in the particular thread.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claims 1, 11, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being

incomplete for omitting essential elements, such omission amounting to a gap between the

elements. See MPEP § 2172.01. The omitted elements are:

Referring to claim 1, "set of methods" needs to be defined in the specification because it is not explicitly clear how the threads interface layer provides thread support in the virtual machine.

Referring to claims 11 and 25, "set of structures" needs to be defined in the specification because it is not explicitly clear of what is cleaned up in the particular thread.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 2 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (US 2001/0049686).

While claims were rejected under 35 USC 112, 1ˢᵗ and 2ⁿᵈ paragraph, in order to advance prosecution, claims will be treated on the merits in view of the examiner's best understanding of the disclosure and the prior art.

Referring to claims 1 and 16, Nelson discloses a software system (software system, [0008]) comprising:

-     **virtual machine ("Java Virtual Machine", [0039]);**

- **native threads interface layer** which adapts the methods of the threads interface layer to a platform which underlies the software system (**Java Native Interface layer**, [0039], Fig. 6, 608, and threads, [0039]).

Nelson fails to explicitly teach:

- **thread interface layer** which has a set of methods that provide thread support according to a **standard threads interface**

However, it would have been obvious to one of ordinary skill in the art that a "standard threads interface" would be needed for " threads support" between the two tiers (threads interface layer and native threads interface layer) because coordination and communication between the two layers are necessary for it to work properly as a whole system.

Referring to claim 2, Nelson teaches having a **Java-based standard threads interface** (**Java class**, [0037], and **Java, Java Native Interface, threads** [0039]);

4.   Claims 3-6, 11, 17-20, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (US 2001/0049686) in view of Delagi (US 3,858,182).

Referring to claims 3 and 17, Nelson fails to explicitly teach maintaining a set of context information for each of a set of threads in the software system in terms of the virtual machine. However, Delagi teaches saving context information from a previous virtual machine to a current virtual machine (context information, virtual machine, restore previous context, col 8 lines 6-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made

to include the Delagi feature of maintaining context information in terms of the virtual machine

to the existing system of Nelson so that the virtual machine can resume the execution of any

program when needed, therefore, increasing efficiency and reducing overhad involved with

resuming execution (col 8, lines 6-15).

Referring to claims 4 and 18, Nelson fails to explicitly teach having the context

information including a value for each of a set of virtual machine registers associated with a

corresponding thread. However, Delagi teaches a system that maps virtual registers by loading

appropriate values into processor registers. It would have been obvious to one of ordinary skill

in the art at the time the invention was made to include this feature with having each register

associated with a corresponding thread to the existing system of Nelson for the reason of having

an organized way for assignment and being easier to keep track of the threads.

5.   Claims 5 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson

(US 2001/0049686) in view of Travis (US 5,619,710).

Referring to claims 5 and 19, Nelson fails to explicitly teach the "native threads interface

layer maintaining a set of context information for each of a set of threads in the software system

in terms of the platform." However, Travis teaches using the context information to select a

platform, thus being platform dependent (context information is also used to select a platform,

col 12, lines 19-22). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to include this feature to the existing system of Nelson so that

the software system will be compatible over various platforms.

6.   Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson

(US 2001/0049686) in view of You (US 6,158,045).

Referring to claims 6 and 20, Nelson fails to explicitly teach having the context

information including a value for each of a set of processor registers associated with the

platform. However, You teaches having a variety of platforms which may vary in the number of

processor registers (platforms, number of processor registers, col 9, line15-26). Therefore, it

would have been obvious to one of ordinary skill in the art at the time the invention was made to

include this feature to the existing system of Nelson so that the software system will be

compatible over various platforms.

Referring to claims 11 and 25, Nelson fails to explicitly teach having "the native threads

interface layer include a method that enables the threads interface layer to:

-   stop an execution of a particular thread and to clean up a set of structures associated with

    the particular thread"

It would have been obvious to one of ordinary skill in the art at the time the invention was made

to stop the execution of a particular thread in order to clean up a set of structures associated with

the particular thread because it is more easy to do than during execution.

7.   Claims 7-10, 14, 15, 21-24, 28, and 29 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Nelson (US 2001/0049686) in view of Gillespie (US 6,269,391).

Referring to claims 7 and 21, Nelson fails to explicitly teach of having a native threads

interface layer include a method that enables the threads interface layer to:

-   **suspend** a particular **thread**.

However, Gillespie teaches this limitation by disclosing a multiprocessor which **suspends**

execution of a **thread** (40, col 4, lines 44-46). It would have been obvious to one of ordinary

skill in the art at the time the invention was made to combine the suspend feature of Gillespie to

the existing system of Nelson for the reason of giving threads more control by being able to stop

or wait (stop/wait, col 4, line 45).

Referring to claims 8 and 22, Nelson fails to explicitly teach of having a native threads

interface layer include a method that enables the threads interface layer to:

-   **resume** a particular **thread**

However, Gillespie teaches resuming a thread to initiate or continue execution of the thread

("**resume** 42 (start), to initiate or continue execution of the thread, col 4, lines 44-49). It would

have been obvious to one of ordinary skill in the art at the time the invention was made to

combine the resume feature of Gillespie to the existing system of Nelson for the reason of giving

threads more control by being able to start execution (col 4, line 46).

Referring to claims 9 and 23, Nelson fails to explicitly teach of having a native threads

interface layer include a method that enables the threads interface layer to:

-   **wait for completion** of a particular **thread**

However, Gillespie teaches that individual threads can have wait times, and thus, it should be

known how long of a wait a particular thread would take to be completed ("**individual thread's**

wait times," col 8, lines51-53). Therefore, it would have been obvious to one of ordinary skill in

the art at the time the invention was made to combine the "wait for completion" feature of

Gillespie to the existing system of Nelson for the reason of giving threads more control by being

able to coordinate CPU-specific scheduling data (col 8, lines 43-59).

Referring to claims 10 and 24, Nelson fails to explicitly teach of having a native threads

interface layer include a method that enables the threads interface layer to:

-   **yield** execution to another thread

However, Gillespie teaches using a "yield" to relinquish control ("**yield** 44 to relinquish control

of the processor", col 4, lines 44-49), and yielding execution to another thread is a type of

control. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the suspend feature of Gillespie to the existing system of Nelson

for the reason of gaining more control of the processor ("**yield** 44 to relinquish control of the

processor", col 4, lines 44-49.

Referring to claims 14 and 28, Nelson fails to explicitly teach of having a native threads

interface layer include a method that enables the threads interface layer to:

    -   obtain an **identifier** of a currently executing **thread**

However, Gilliespie teaches having a CPU assignment identifier ("**CPU assignment identifier 134**", col 7, lines 46-55), which serves the purpose of identifying such assignments that could include threads. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the "thread identifier" feature of Gillespie to the existing system of Nelson so that a particular thread can be identified/tracked during execution.

Referring to claims 15 and 29, Nelson fails to explicitly teach of having a native threads interface layer include a method that enables the threads interface layer to:

    -   select a **thread for execution**

However, Gillespie teaches issuing a request (48) for a thread (50) (col 7, lines 42-46) and having a resume or start executable (76) to **indicate if a thread is ready to run** (col 7, lines 46-47). When the system determines when the thread is ready to run, it "selects" the thread for execution. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the "select a thread for execution" feature of Gillespie to the existing system of Nelson for the reason of giving threads more control during execution by being able to select between various threads.

8.   Claims 12, 13, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (US 2001/0049686) in view of Farrell (US 5,630,128).

Referring to claims 12 and 26, Nelson fails to explicitly teach of having a native threads interface layer include a method that enables the threads interface layer to:

- **set** a **priority** of a **particular thread**

However, Farrel teaches setting a priority of a particular thread ("**select** each **thread's priority**", col 4, lines 3-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the "set a priority of a particular thread" feature of Farrell to the existing system of Nelson for the reason of giving threads more control by being able to favor certain threads over others.

Referring to claims 13 and 27, Nelson fails to explicitly teach of having a native threads interface layer include a method that enables the threads interface layer to:

- obtain priority of particular thread

However, Farrell teaches that "the highest priority thread on the run list is executed first" (col 4, lines 8-9) which shows that a priority is distinguished and obtained in a thread. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the "obtain priority of a particular thread" feature of Farrell to the existing system of Nelson for the reason of giving threads more control by being able to identify priority so that certain threads can be favored over others.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (703) 305-5334. The examiner can normally be reached on 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alvin Oberley can be reached on (703)305-9716. The fax phone numbers for the organization where this application or proceeding is assigned are none for regular communications and none for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is none.

Kenneth Tang

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August 8, 2002

MAJID A. BANANKHAH
PRIMARY EXAMINER